5.2.1 Mobilization/Demobilization

Tetra Tech will coordinate closely with all site personnel and the Army staff assigned to the project to ensure that the equipment, supplies, and other resources needed to support ordnance activities are present onsite. Tetra Tech will schedule the arrival of the work force in the most effective manner designed to allow immediate productivity. All Tetra Tech and subcontractor personnel mobilized to the Site for ordnance operations will have completed OSHA HAZWOPER training and will meet medical surveillance requirements, as specified in the HASP.

On-site Training

As part of the mobilization process, Tetra Tech will perform site-specific training for all onsite personnel assigned to ordnance support tasks. The purpose of this training is to ensure that all onsite personnel fully understand the operational procedures and methods to be used at this site, including individual duties and responsibilities, and all safety and environmental concerns associated with operations. Any personnel arriving at the site after this initial training session will have to complete the training before starting work. The SUXOS and the UXOSO will conduct the training, which will include the following topics:

1. Field equipment operation, including safety precautions and equipment, field inspection of equipment, and maintenance procedures that will be used;
2. Procedures, guidelines, and requirements in relevant sections of this CAWP and the HASP, as they relate to the tasks being performed;
3. Site and task specific hazards, including physical, biological, and chemical hazards;
4. Public relations, including encounters with the press and public;
5. Environmental concerns and sensitivities, including endangered/threatened species and historic, archaeological, and cultural (HARC) resources onsite; and
6. Specific ordnance materials (MEC, MC, and demolition materials) potentially found onsite or proposed for use in disposal of MEC/MC.

Equipment

Project equipment for ordnance support activities will come from Tetra Tech sources, subcontractors, and local vendors offering equipment for lease or purchase. All equipment, regardless of source, will be inspected to ensure completeness and operational readiness. Any equipment found damaged or defective will be repaired or returned for replacement. All instruments and equipment that require routine maintenance and/or calibration will be inspected initially upon arrival and then periodically as required in the CAWP. This system of checks ensures

that the equipment onsite is functioning properly. If an equipment check indicates that any piece of equipment is not operating correctly and field repair cannot immediately be accomplished, the equipment will be removed from service until it can be repaired. Alternately, the equipment may be replaced with a like model or an approved substitute. Replacement equipment will meet the same specifications for accuracy and precision as the equipment removed from service.

Communications

As part of the initial equipment setup and testing, Tetra Tech will also install and test its communication equipment, including the following:

1. Hand-held portable radios, with a range of 2 miles, will be used to maintain communications between the SUXOS (Tetra Tech Base) and the field teams;
2. Cellular telephones, acquired through a local cellular service (very high frequency band 150-174), will be used as backup communications between the SUXOS and the field teams; and
3. Landline telephones installed in the Tetra Tech project office will complete the communication system and will provide ready access to offsite emergency and medical services.

Notifications/Coordination

During mobilization, the SUXOS and UXOSO will coordinate with local police and fire services and other agencies to ensure availability of resources that may be needed during the course of the project. At a minimum, coordination will occur with the following agencies and services:

- The Client (to reconfirm priorities/schedules and to identify any changes in the scope of work);
- Appropriate state/county personnel;
- Local police/sheriff's department personnel;
- Local fire department personnel;
- Local hospital staff; and
- Local vendors and suppliers.

5.2.2 Temporary Improvement of Roads, Stream Crossings, and Staging Areas

Following mobilization, the roads, stream crossings, and staging areas that will be used for the work and the associated ordnance activities will be improved to accommodate large dump trucks, heavy equipment, and other large or heavy vehicles safely. These improvement activities will incorporate

ordnance avoidance/surface clearance, as necessary, to safeguard personnel conducting the improvement activities.

Two staging/work areas will be used to facilitate the ordnance activities. One area near the Camp Bonneville cantonment area will be prepared for soil screening and storage (stockpiles). A second staging area will be created at the Landfill to facilitate onsite activities. This latter area will be used for storage of materials and chemicals used on-site and will be the location of an approved, sited portable magazine for storage of donor explosives used for MEC disposal. A Connex box or other temporary storage unit will be set up in this staging area for short-term storage of MC and MD. This storage unit will be enclosed by a fence with a locking gate to prevent entry by unauthorized persons. The staging area near the Landfill may also be the site of a storage locker or other storage facility for any hazardous chemicals brought onsite for the project. This storage area will also be fenced to prevent unauthorized access to potentially dangerous substances. Ordnance avoidance/surface clearance will be performed, as necessary, to protect personnel building the staging areas. More detailed procedures for surface avoidance are provided in Appendix A, SOP 1.

5.2.3 Conventional Survey of the Landfill Work Area, Establishment Corners and Boundaries

Before starting field activities in the Landfill work area, the work area boundaries will have to be delineated. Tetra Tech personnel or professional land surveyors will stake the boundary of the work area in accordance with information provided in the Statements of Work for the project. The estimated footprint of the Landfill is a rectangle measuring 120 by 200 feet (approximately 1.3 acres). A 40-foot buffer will be added around the Landfill as part of the work area. Stakes will be placed at intervals sufficient to properly delineate the boundary for follow-on activities.

A qualified UXO Technician II or III, who will provide MEC avoidance, will accompany the team performing the staking work. The UXO technician will sweep the areas where survey personnel will walk or place stakes. Surface MEC/MC items will be flagged/marked for future removal, and survey team members will be cautioned not to walk in areas near these items. Survey personnel may also be instructed to leave the work area upon discovery of an item considered to be immediately dangerous or unstable. The technician performing ordnance avoidance will have the authority to stop work at any time based on an imminent danger posed by MEC. Work will not resume until the UXOSO indicates that it is safe. If a subsurface metallic anomaly is detected at a location where a survey stake is to be placed, the stake will be moved to prevent contact with the item causing the anomaly. Detailed procedures for ordnance avoidance are presented in Appendix A, SOP 1. Required documentation for field operations is discussed in Section 7.

5.2.4 Surface MEC/MC Clearance/Brush Removal

During this task, the surface of the Landfill will be cleared of MEC/MC and metal debris. Concurrently, the brush and small trees growing on the Landfill are expected to be removed. These actions will help ensure the safety of personnel performing subsequent cleanup actions and ordnance-related tasks and will improve the ability of UXO personnel to screen the Landfill area for subsurface metallic items during various stages of the soil and debris removal.

After the boundary of the work area has been staked, a UXO team will perform the surface clearance/brush removal. The team will establish an EZ, set up survey lanes, and perform a detector-aided sweep of the survey lanes to identify all metallic items (including MEC/MC and MD) entirely or partially visible on the ground surface. These items will be managed in accordance with the procedures in Section 5.2.9. No intrusive work will be conducted during the surface clearance. Detailed procedures for this task are presented in Appendix A, SOP 2. Required documentation for field operations is discussed in Section 7.

5.2.5 Removal of MEC/MC in Shallow Landfill Soils

This task will be composed of two subtasks: verification of the size of the Landfill area and tiered soil removal. Each subtask is described below.

5.2.5.1 Geophysical Survey to Verify Size of Work Area

Following the initial clearance to a depth of 1 foot, a geophysical team will survey the Landfill work area using a Geonics EM-61 coupled to a RTS (or other approved location system) for positioning. This survey will be conducted to verify the estimated size and layout of the historical ordnance disposal area. Data will be collected over the entire work site; however, these data will be interpreted only to the degree necessary to obtain general information regarding the large-scale lateral extent of subsurface metallic anomalies potentially representing buried MEC/MC.

A one- or two-man team, accompanied by a UXO escort, will conduct the geophysical survey. Data will be acquired at an approximate line spacing of 5 feet over the 1.3 acre survey area. The EM-61 data will be digitally recorded at a rate of 12-15 samples per second, and RTS position data will be digitally recorded at a rate of 3 - 4 samples per second. Data will be processed at the end of each day to ensure the data are of sufficient quantity and quality to meet the project objectives.

In general, the geophysics QC program consists of a battery of pre-project testing and, once the project has started, a test regimen for each data acquisition session (usually 2-3 times per day). The test regimen includes functional checks to ensure the position and geophysical sensor instrumentation is functioning properly prior to and at the end of each data acquisition session; processing checks to ensure the data collected are of sufficient quality and quantity to meet the project objectives, and interpretation checks to ensure the processed data are representative of the

site conditions. Field personnel, data processors, and data interpreters implement the project and corporate QC programs in a consistent fashion.

Pre-project tests include functional checks to ensure the position and geophysical sensor instrumentation is operating within defined parameters, and includes the following:

- Static tests lasting 15 minutes for the EM-61 system;
- Cable integrity tests for the EM-61 system;
- Manufacturer suggested functional checks for RTS positioning systems;
- Time-stamp relative accuracy tests for position and EM-61 systems; and
- PCMCIA card integrity checks.

Specific functional checks conducted during the data acquisition program include the following:

- Acquisition personnel metal check (ensure no metal on acquisition personnel);
- Static position system check (accuracy and repeatability of position);
- Static geophysical sensor check (repeatability of measurements, influence of ambient noise);
- Static geophysical sensor check with test item (repeatability and comparability of measurements with metal present);
- Kinematic geophysical sensor check with test item (repeatability and comparability of measurements with sensor in motion);
- Repeatability of overall data (re-survey of a portion of the survey area during each data acquisition session); and
- Occupation of survey monuments to ensure comparability, accuracy, and repeatability of RTS positioning system.

All geophysical field data will be archived and backed up on a daily basis. The geophysical data will be used to generate color-coded maps of the EM-61 sensor intensity that represent the lateral limits of the potential burial area (first survey), as well as larger, isolated metal items residing within the burial area (second survey—see Section 5.2.6.1). All raw, processed, and interpreted data, as well as the QC checks, will be delivered to the client (as necessary) at the end of the field investigation. The processing/interpretation criteria and protocol are digitally recorded and stored in the project files so that the sequence of events can be reconstructed at a later date, if necessary.

5.2.5.2 Tiered Excavation of Shallow MEC Contaminated Soils

This phase of ordnance operations is intended to incrementally remove MEC, MC, and other metal debris from the upper soil horizon of the Landfill so that relatively accurate screening of deeper soils can be conducted. This will be accomplished by first removing all detectable ordnance items from the upper foot of the Landfill, then carefully scraping away a 6-inch lift of soil under the observation of a trained and qualified UXO technician. This process will be repeated until no subsurface metallic anomalies are detected. Once this objective has been satisfied, the geophysical screening discussed in the next section can be implemented to help verify that no large pieces of ordnance are present in the deeper soils of the Landfill.

The team will establish an EZ, set up survey (work) lanes, and perform MEC/MC clearance in the upper foot of the soil by using a metal detector to identify targets that will be investigated in real time. This methodology is referred to as "mag and dig." When the MEC/MC removal is complete, a chemical-based EZ will then be set up within the ordnance-based EZ, and construction personnel will enter the zone to excavate a 6-inch lift of soil. This chemical-based EZ will be configured so that dump trucks entering the work area to transport excavated soils will not have to enter this zone. Following excavation of the first lift, construction personnel will leave the ordnance-based EZ and the process will continue with clearance of the next 1-foot lift of soil.

The MEC/MC, MD and metal waste that are located will be managed in accordance with the procedures in Section 5.2.9. Detailed procedures for this task are presented in Appendix A, SOP 3. Required documentation for field operations is discussed in Section 7.

5.2.1 Removal of MEC/MC in Deep Landfill Soils

Removal of MEC/MC in deep landfill materials is performed in two phases. Geophysical surveys are used to locate potential targets and then the targets are investigated.

5.2.1.1 *Performance of a Geophysical Survey*

When magnetometer sweeps indicate that no more significant metallic items are located in the top foot of the soil, a second geophysical survey will be performed over the Landfill area to identify any potential large metal items remaining. This second geophysical survey will be performed in the same manner as the first survey (see Section 5.2.5.1); however, transect spacing will be reduced to between 2 and 2.5 feet for the second survey. The data from this survey will be interpreted to yield a target list with horizontal locations (coordinates), estimated depths, and relative sizes for the anomalies of interest. As with all other activities at the project site, a UXO escort/observer will be onsite at all times to provide ordnance avoidance for the geophysical team.

5.2.1.2 *Intrusive Investigation of Geophysical Anomalies*

Anomalies identified during the geophysical survey will be evaluated to determine which, if any, of the anomalies potentially represent large metallic items buried deep within the Landfill. Those anomalies identified will be investigated and, if necessary, removed. UXO teams conducting the intrusive investigation of subsurface anomalies identified during the geophysical survey will establish an EZ, reacquire target locations, mark the locations, excavate by hand or using heavy equipment, and identify and remove MEC/MC. The geophysicists will provide the teams with dig packages containing the coordinates and estimated depths of all targets for investigation.

The MEC/MC and metal waste that are located will be managed in accordance with the procedures in Section 5.2.9. Detailed procedures for this task are presented in Appendix A, SOP 4. Required documentation for field operations is discussed in Section 7.

5.2.2 MEC Avoidance for Soil Removal Action

Following completion of the planned MEC/MC removal activities, the remaining soils and debris in the Landfill will be removed to eliminate the source of groundwater contamination at the Site. This work will be performed in accordance with procedures provided in other sections of the CAWP. Since the Landfill was used as a disposal area for MEC, however, a single UXO technician will observe all intrusive activities and identify any potential ordnance items uncovered. The technician will be positioned out of the danger zone for the heavy equipment onsite, but in an area with a clear view of the excavation and soil loading activities. If any suspect items are observed, the technician will halt work to examine the items and, if necessary, will arrange for removal and disposal.

The MEC/MC and metal waste that are located will be managed in accordance with the procedures in Section 5.2.9. Detailed procedures for this task are presented in Appendix A, SOP 1. Required documentation for field operations is discussed in Section 7.

5.2.3 Mechanical Screening of Soils for MEC/MC

The soil removed from the Landfill may still contain relatively small metallic items and some small MEC/MC (small arms ammunition and, potentially, 20 mm projectiles). Therefore, the soil will be screened using mechanical screening techniques to separate debris and metallic items from the soil. Processed soil will be stockpiled for chemical evaluation and disposal. Debris and metallic items will be inspected individually to ensure that no residual explosive materials or MEC remain.

MEC/MC and metal waste located will be managed in accordance with the procedures in Section 5.2.9. Detailed procedures for this task are presented in Appendix A, SOP 1. Required documentation for field operations is discussed in Section 7.

5.2.4 Management and Disposition of MEC/MC, MD and Metal Waste

Several waste streams will be generated by the ordnance related tasks performed at the Landfill. These types of waste will include the following:

- MEC;
- MC (MEC related items that were, by design, exposed to energetic materials [formerly called OE waste]);
- MD (MEC related items that were not, by design, exposed to energetic materials [formerly called OE scrap]);
- Non-ordnance metallic debris; and
- Non-metallic debris.

This section of the CAWP describes the methodology that will be used to deal with the various wastes generated by the MEC/MC avoidance/removal activities.

5.2.4.1 *Munitions and Explosives of Concern*

Discovery and Identification

Trained MEC personnel (Technician III level or higher) will make preliminary MEC identifications based on personal education, training, and experience using appropriate ordnance publications. These individuals will be the appointed team leaders for the UXO Teams. The SUXOS will verify the identification of all MEC items before the items are removed from the work area or, if necessary, blown-in-place (BIP). If site UXO personnel are unable to identify a suspect MEC item, the SUXOS will request assistance from the Army representative at Fort Lewis.

Management and Handling

MEC located at the Landfill during any of the various ordnance-related tasks will be examined and identified. If an item is safe to move, it will be taken to a pre-determined location at the Landfill for disposal. If the item is not safe to move, it will be BIP. MEC located during soil screening operations at the stockpile/staging area near the Camp Bonneville cantonment area will be transported back to the Landfill for disposal, if it is safe to do so.

The preferred approach for disposal of MEC will be to have donor explosives stored on site in an approved, sited magazine. If this practice is infeasible for any reason (e.g., MEC is located before the magazine is placed on site), donor explosives may be delivered by an approved on-call vendor. Work hours may be adjusted to allow sample time for same day explosive delivery and MEC disposal. MEC will be tracked from discovery to disposal using the MEC Intrusive Data Sheet/MEC Accountability Form and the MEC Accountability Log (see Section 7, Documentation).

MEC Disposal/Disposition

All MEC discovered during the course of this project, whether they are discovered at the Landfill or during soil screening operations, will be disposed of at the Landfill. Disposal will be accomplished using detonation with donor explosives. Since the required separation distance for larger MEC cannot be attained within the Camp Bonneville boundaries, the DoD-approved sandbag method found in the U.S. Army Corps of Engineers HNC-ED-CS-98-7, *Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions (USACE, 1998)* will be implemented as appropriate. MEC will be destroyed in accordance with the procedures contained in Appendix A, SOP 5. Required documentation for field operations is discussed in Section 7. When feasible, disposal operations will be conducted between the hours or 4 p.m. and 6 p.m. to allow neighborhood residents to plan and prepare for these operations. However, MEC items that must be BIP due to their unstable or dangerous condition will be disposed of as they are found to ensure the safety of site personnel.

Following controlled detonation of MEC for purposes of disposal, the SUXOS will inspect residual metal scrap to ensure that complete disposal has been accomplished and energetic materials have been destroyed. The metal scrap will then be containerized and placed in the designated storage area near the Landfill. No scrap from MEC disposal will be removed from Camp Bonneville or otherwise disposed of until a representative of the Army inspects the material jointly with the SUXOS to ensure that all energetic materials have been eliminated via detonation. Once this inspection is complete, the metal scrap will either be transferred to a local recycling company or to a demilitarization facility for final disposition. As an alternative, this metal waste may be disposed of at a predetermined location at Camp Bonneville with the consent of the Army. Ecology will be included in any decision process regarding disposal of metal waste on site.

5.2.4.2 *Munitions Components*

Discovery and Identification

Trained MEC personnel (Technician III level or higher) will make preliminary MC identifications based on personal education, training, and experience, using appropriate ordnance publications. These individuals will be the appointed team leaders for the UXO Teams. If the UXO team leader cannot identify MC, then the SUXOS will be contacted to assist with the identification before the item is removed from the work area. If site UXO personnel cannot identify a suspect MEC item, the SUXOS will request assistance from the Army representative at Fort Lewis.

Management and Handling

MC found at the Landfill will be consolidated at predetermined locations during the workday.

At the end of the workday, the MC will be transported to the staging area next to the Landfill where it will be inspected by the SUXOS to ensure that no scrap or MEC items have been included with

the MC. After inspection, the MC will be placed in a 55-gallon drum or other suitable container and stored in a fenced compound at the staging area. As an alternative, the MC container(s) may be stored in a locking Connex Box or other portable storage unit that can be secured with a padlock. When enough material has accumulated, the MC will be combined with MEC find(s) for disposal by detonation.

MC found during soil screening operations at the staging area near the Camp Bonneville cantonment area will be handled the same way as that found at the Landfill; however, it will have to be transported back to the Landfill storage area for storage.

Disposal/Disposition

MC will be consolidated and disposed of during scheduled disposal operations for MEC. Metal scrap will then be containerized and placed in the designated storage area near the Landfill. No scrap from MC disposal will be removed from Camp Bonneville or otherwise disposed of until a representative of the Army inspects the material jointly with the SUXOS to ensure that all energetic materials have been eliminated via detonation. Once this inspection is complete, the metal scrap will either be transferred to a local recycling company or to a demilitarization facility for final disposal. As an alternative, this treated material may be disposed of at a predetermined location at Camp Bonneville with the consent of the Army. Ecology will be included in any decision process regarding disposal of metal waste on site.

5.2.4.3 *Munitions Debris*

Discovery and Identification

Trained MEC personnel (Technician III level or higher) will make preliminary MD identifications based on personal education, training, and experience, using appropriate ordnance publications. These individuals will be the appointed team leaders for the UXO Teams. If the UXO team leader cannot identify MD, then the SUXOS will be contacted to assist with the identification before the item is removed from the work area. If site UXO personnel cannot identify a suspect MD debris item, the SUXOS will request assistance from the Army representative at Fort Lewis.

Management and Handling

Munitions Debris found at the Landfill will be consolidated at predetermined locations during the workday. At the end of the workday, the debris will be transported to the staging area next to the Landfill where it will be inspected by the SUXOS to ensure that no MC or MEC have been included with the debris. After inspection, the MD will be placed in a 55-gallon drum or other suitable container and stored in a fenced compound at the staging area. As an alternative, the debris containers may be stored in a locking Connex Box or other portable storage unit that can be secured with a padlock.

MD found during soil screening operations at the staging area near the Camp Bonneville cantonment area will be handled the same way as that found at the Landfill; however, it will have to be transported back to the Landfill storage area for storage.

Disposal/Disposition

MD will be consolidated and disposed of along with metal scrap generated during the disposal of MEC and MC. No MD will be removed from Camp Bonneville or otherwise disposed of until a representative of the Army inspects the material jointly with the SUXOS to ensure that there are no energetic marterials present. Once this inspection is complete, the metal scrap will either be transferred to a local recycling company or to a demilitarization facility for final disposal. As an alternative, this treated material may be disposed of at a predetermined location at Camp Bonneville with the consent of the Army. Ecology will be included in any decision process regarding disposal of metal waste on site.

5.2.5 Decontamination of Equipment

Heavy equipment used during ordnance operations at the Landfill will be decontaminated in accordance with procedures provided in the CAWP sections dealing with construction work.

5.3 QUALITY CONTROL

This section of the CAWP presents the QC regime that will be applied to ensure that the MEC avoidance activities (whether conventional avoidance or avoidance via removal) incorporated into the interim remedial action at the Landfill are performed in a high-quality, technically sound manner. The systematic management quality processes and procedures presented here have been designed to create confidence that the project requirements and objectives will be achieved. QC personnel assigned to this project may be assigned other duties for the project, but will ensure that the QC responsibilities are properly addressed.

5.3.1 Objectives

QC objectives for the project are to optimize the following:

- Effectiveness—The degree to which the project team meets and preferably exceeds the customer's needs and requirements; and
- Efficiency—The rate at which resources are consumed in striving for effectiveness. Optimizing this objective leads to customer satisfaction by minimizing time and cost, and maximizing value.

5.3.2 Organization

Tetra Tech uses a matrix structure to efficiently allocate human resources for each project, so project managers can fully serve their clients' needs. A combination of internal and external resources provides the best possible result. The key personnel within the project directly responsible for the provision of quality are the Project Manager and the UXOQC. These two people are tasked with directly designing and implementing the quality system. Within the company's Environmental Safety and Quality (ESQ) Department, other independent personnel work to support and scrutinize the service delivery process. These personnel include the Tetra Tech Corporate Quality Manager at the company level and the UXO Quality Manager at the program level.

5.3.3 Personnel

Personnel performing work quality control work on this project will be appropriately trained and qualified with documentation provided in accordance with Tetra Tech requirements, contract requirements, and applicable portions of industry standards and practices. Personnel selected to perform duties as the UXOQC will possess the education, experience, and training commensurate with the specified activity and contract requirements. The UXOQC has the following responsibilities:

- Implementing the requirements of the three-phase, project QC plan;
- Supervising and directing personnel performing QC tasks;
- Conducting surveillance and inspection activities;
- Identifying, evaluating, initiating, recommending, or providing solutions and corrective actions to ensure that contract requirements are being met;
- Providing weekly project QC updates to the Project Manager and the QC Project Manager;
- Conducting QC familiarization training for project personnel and site visitors; and
- Issuing temporary stop work orders.

The UXOQC, with the concurrence of the Project Manager, may stop or suspend work when health and safety requirements are being compromised or the level of quality is such that a nonconforming condition or delivery of an unsatisfactory product may occur. A stop work order may be issued and left in place until the situation is corrected. A stop work order may also be issued for a portion of a process, allowing as much useful work to continue as possible, thus limiting the adverse impact of the stop work order on areas not affected by the condition.

5.3.4 Quality Control Planning

Two types of QC procedures are planned during this project, including the following:

- Process QC—The heart of process QC is identification, monitoring, and continuous improvement of the core and support processes implemented during the project; and
- Product QC—Procedures that fall into this category test the end product of the processes for conformance to quality requirements.

The ordnance-related work planned at the Landfill is construction support for the interim cleanup action for soil removal; therefore, there are no specific achievement criteria for the end product other than those driven by safety considerations. The soil that has been removed from the Landfill will ultimately be disposed of at non-hazardous or hazardous-waste landfills and must, therefore, be free of dangerous MEC/MC. The rigorous MEC/MC avoidance and removal procedures incorporated into the CAWP, including processing the shallow soils excavated during the mag & dig process through specifically sized screens to remove small MEC/MC items, are very reliable. Little product QC will be necessary, provided that the process QC measures in the plan are properly implemented. The emphasis for the project will be on process controls that will ensure compliance with the CAWP procedures.

5.3.4.1 *Process Quality Control*

This component of the QC function is an integral part of each process and is usually managed by the UXOQC, who works closely with project managers and the field supervisors to identify and meet project and quality objectives. Identified quality criteria of the inputs and outputs of each process identified are used as a basis for the assessment of each process. Flexibility is incorporated to allow due attention to those areas that need it most. The criteria for assessment can be changed at any time, depending on the nature of the situation. Process QC resources are finite, and good judgment is required to allocate resources appropriately to maximize process efficiency and effectiveness.

Process QC is conducted using a three-phase control process consisting of preparatory, initial, and follow-up (surveillance) inspections to ensure that processes are under control, and opportunities for improving processes are captured and implemented. Use of proactive process QC is a prevention approach. The inspection points selected for process QC during MEC operations at the Landfill are presented in Table 5-2.

Table 5-2
Inspection Points for Process Quality Control

Activity	Inspection Criteria
Surface Clearance	Verify that daily equipment checks are performed
	Re-survey 5% of the surface clearance area to confirm adequate removal of MEC/MC
Mag & Dig	Verify that daily equipment checks are performed
	Re-survey 5% of the clearance area to confirm adequate removal of MEC/MC
Tiered Soil Removal	Post UXO observers to identify potential MEC during excavation
	Verify that no more than 6 inches of soil are removed with each equipment pass (Laser level or other approved method)
	Verify that adequate freeboard is maintained in haul trucks to prevent loss of soil during transport to the screening area
Geophysical Survey	Verify that daily equipment checks are performed
	Perform senior level review of EM-61 interpretation data to ensure that interpretation process was carried out IAW the established procedures
Intrusive Investigation	Check geophysical dig data using geo-reference points at the site to ensure proper positioning
	Verify that daily equipment checks are performed
	Perform inspection of approximately 5% of digs to ensure adequate removal of MEC/MC
Soil Screening	Verify that unscreened and screened soils are being segregated in clearly delineated areas
	Ensure that plant operating speed is slow enough to allow identification of MEC items
	Verify that staff rotation is adequate to maintain alertness of observers

Preparatory Phase Inspection

A preparatory phase inspection will be performed before starting each ordnance-related process identified for the project. This inspection reviews applicable specifications and verifies that the necessary resources, conditions, and controls are in place and compliant before the start of work activities. The QC staff for each preparatory phase inspection should perform the following actions:

- Verify that appropriate plans and procedures are developed, approved, and available;
- Verify that personnel identified are available and meet the requirements qualifications for the position;
- Verify that the required training has been performed;
- Verify that identified equipment is available, functional, and appropriate for the job;
- Verify that the preliminary work and coordination have been accomplished;

- Verify that the level of quality expected is understood;
- Verify that the CAWP and the SOPs have been reviewed and are understood by the workers; and
- Conduct a briefing on the process improvement goals.

All necessary actions are listed on the Preparatory Phase Inspection Checklist. The specific QC activities performed during the preparatory phase inspection and the results of those activities will be documented on a QC surveillance report that will be attached to the daily QC report. Examples of these forms are provided in Appendix B.

Initial Phase Inspection

An initial phase inspection will be performed the first time a parcel of work is performed under a defined process. The purpose of the inspection is to check the preliminary work for compliance with procedures and contract specifications. Another aim is to establish the acceptable level of workmanship, check safety compliance, review the preparatory phase inspection, check for omissions, and resolve differences of interpretation. The following tasks will be performed during these inspections:

- Verification that deficiencies identified during the preparatory phase have been corrected;
- Verification that requirements of quality of workmanship will be established;
- Verification that readiness review actions are complete;
- Resolution of any differences of interpretation;
- Review of CAWP and applicable documents to ensure that the requirements are being met; and
- Observation of work to verify the adequacy of the work.

All necessary actions are listed on the Initial Phase Inspection Checklist. Discrepancies between site practices and approved plans/procedures will be resolved, and the UXOQC, or a designee, will verify corrective actions for unsatisfactory conditions or practices. The specific QC activities performed during the initial phase and the results of those activities will be documented on a QC surveillance report that will be attached to the daily QC report. Examples of these forms are provided in Appendix B.

Follow-up Phase Inspection (Surveillance)

The follow-up phase inspection will be performed on a scheduled and unscheduled basis. The purpose of the inspection is to ensure a level of continuous compliance and workmanship. The UXOQC is responsible for onsite monitoring of the practices and operations taking place and

verification of continued compliance with the specifications and requirements of the statement of work and approved SOPs. The following activities should be performed during each inspection:

- Inspection/surveillance to ensure that the work is in compliance with the statement of work and plans;
- Inspection/surveillance to ensure that the required level of workmanship is maintained; and
- Inspection/surveillance to ensure that the project logbook is properly filled out and maintained.

Follow-up results, positive or negative, will be documented on a surveillance report that is attached to the daily QC report. Examples of these forms are provided in Appendix B.

5.3.4.2 *Product Quality Control*

Product QC consists of the inspection procedures that ensure the final product is fit for its purpose before it is handed over to the client. This is a detection approach to QC, and proactive process QC inspections should be passed before the product proceeds to this stage. Percentage sampling is the selected method of product QC for this project.

Percentage sampling is a simple way to apply to the inspection of outputs from processes. Depending on the expected quality, past findings, and other characteristics of the product population, a fixed percentage is selected. A random sample of the final product based on that percentage is then inspected in order to determine the acceptability of the product population. This type of sampling strategy will be applied to the soils that have been identified for offsite disposal. Approximately 5% of the material randomly selected from the soil stockpiles will be spread on liner material in the stockpile/staging area. A UXO technician will perform a detector-aided, visual examination of the soil to determine whether any MEC/MC remains. If any suspect material is found, corrective action will be performed before disposal of the soil.

5.3.4.3 *Equipment Function Checks and Calibration*

Equipment function testing and calibration are major elements in the process QC for this project. Effective removal of MEC/MC from the landfill soils relies heavily on properly functioning detection equipment. All MEC/MC detection equipment will be function tested daily utilizing an onsite test bed or other approved methods. The test bed will be constructed in an area that has been cleared of MEC/MC and metal debris. It will contain one or more MEC-like items buried at known depths in order to facilitate function testing of a variety of instruments. Instruments will be function tested in accordance with the manufacturer's recommendation unless otherwise approved.

Equipment which is not functioning properly will not be used until it has been repaired or replaced and proper function has been demonstrated.

Instrument Standardization for the EM-61

Standardization Procedures

No calibration or standardization will be made to the instrument because it is calibrated before leaving the factory. Measurements will, however, be recorded over a portion of an existing data acquisition line or at a designated location before commencement of each data acquisition session to provide information on the precision and repeatability of the positioning and EM-61 data measurement processes.

Abbreviated Standardization Checks

When no metal is present and the EM-61 is stationary, the standard deviation of the readings for the top and bottom coils should not be in excess of 1mV. These repeatability data are collected before each data acquisition session and analyzed during processing.

Instrument Response to a Known Standard

Before and subsequent to data acquisition activities at each survey area, a metallic target will be placed on the ground surface. This test may be performed using a large piece of metal placed on the ground such as a trailer hitch. Data are acquired over the target at least three times in an alternate direction. This procedure ensures that the timing differences between the location system clock and EM-61 clock can be accounted for in data processing. These data can also be analyzed to provide information on the characteristic response of the instrumentation in an area with specific characteristics (i.e., topography, geology, vegetation).

5.3.5 Corrective Action

Once a product or a process displays a characteristic out of specification with those required by the project or quality objectives, corrective action must be conducted to identify the cause of the deficiency or nonconformance. When the cause of the problem is identified, appropriate corrective action can be instituted and then monitored for effect. Deficiency notices and nonconformance reports will be used to track the identification and correction of problems; however, they will not be submitted to the client unless a significant problem is noted that requires input from the client for resolution. Examples of deficiency and non-conformance reports are in Appendix B.

5.3.5.1 *Root Cause Analysis*

Both the deficiency and nonconformance report forms contain an area for the entry of information regarding the cause of the problem and proposed resolution. Determining the root cause of a deficiency or nonconformance is an integral part of the QC process. The depth and extent of the

root cause analysis depends on the situation; it may be as simple (minor) as an overlooked step or procedure, or it may be quite complicated. Root cause analysis is the responsibility of the functional manager or a designee.

Input can be obtained as necessary from field personnel and technical advisors in order to identify the factors that led to the problem. The root cause is almost always "upstream" from where the problem was detected. A two-step strategy will be employed for determining the root cause of a deficiency or non-conformance for this project. First, the problem will be traced back to the source. Second, the cause will be evaluated using basic questions such as who, what, when, where, why, and how. This process is repeated until the cause is identified.

5.3.5.2 *Implementation of Corrective Action*

Following the root cause analysis, the project personnel will undertake the most effective remedy to correct the problem. Potential remedies considered may include the following:

- Supplemental personnel training;
- Changes of equipment or modification of equipment currently in use;
- Acquisition of supplemental equipment;
- Implementation of new procedures or modification of existing procedures; and
- Changes in QC procedures.

Successful implementation of corrective action will be documented on the deficiency or nonconformance report. Through follow-up phase surveillance, the project QC representative will verify that the corrective action implemented has rectified the deficiency or nonconforming condition and is sufficient to prevent recurrence. Examples of deficiency and non-conformance reports are in Appendix B.

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6. IMPLEMENTATION OF SOIL REMOVAL ACTIVITIES FOR THE PROPOSED INTERIM ACTION

The following sections discuss the various related components of the proposed interim cleanup action.

6.1 MOBILIZATION

Tetra Tech personnel will coordinate closely with the Army staff assigned to the project to ensure that the equipment, supplies, and other resources needed to support the construction activities are present onsite. The work force will be scheduled to arrive in the most effective manner to allow for immediate productivity. All staff and subcontractor personnel mobilized to the Site will have completed OSHA HAZWOPER training and will meet medical surveillance requirements, as specified in the HASP.

Any required training will be part of the mobilization process. The purpose of this training is to ensure that all onsite personnel fully understand the operational procedures and methods to be used at this site, including individual duties and responsibilities and all safety and environmental concerns associated with operations. Any personnel arriving at the Site after this initial training session will have to complete the training before starting work. Training will include the following topics:

1. Field equipment operation, including safety precautions and equipment, field inspection of equipment, and maintenance procedures that will be used;
2. Procedures, guidelines, and requirements in relevant sections of this CAWP and the HASP, as they relate to the tasks being performed;
3. Site and task-specific hazards, including physical, biological, and chemical hazards;
4. Public relations, including encounters with the press and public;
5. Environmental concerns and sensitivities, including endangered/threatened species and HARC resources onsite; and
6. Specific ordnance materials (MEC, MC, and demolition materials) potentially found onsite or proposed for use in disposal of MEC/MC.

Any required permitting support will also be provided during mobilization.

6.2 SITE PREPARATION

Before the commencements of the excavation and disposal of the Landfill debris/soils, several site preparation activities are expected to be required. The activities include the preparation of the soil stockpile areas, the equipment staging area, and the equipment decontamination station; improvements to the existing roadway and bridge; and the preparation of the Landfill buffer and work area.

6.2.1 Clearing and Grubbing

All areas identified for improvements (stockpile, staging and work areas, and truck turnouts) that are currently vegetated will be cleared of all significant vegetation. The brush and trees that are removed will be stockpiled for salvage or disposal at a later date. Clearing and grubbing in the area of the former landfill will be performed with the aid of UXO-trained personnel in accordance with Section 5.2.4 of this Plan.

6.2.2 Road and Creek Crossing Improvements

The existing access road and creek crossing were not designed to handle the increased traffic associated with the removal of the Landfill and may require some improvements. The ½ - ¾ mile long single lane road will be graded smooth and as necessary will be upgraded, as required, with a compacted layer of 3 to 6 inches of base course to remove ruts, holes, and soft spots. In addition, to accommodate traffic in two directions, two turnouts may be constructed along the access road. The turnouts and the turnaround will be graded smooth and covered with a compacted layer of 3 to 6 inches of base course as well.

In addition to the road improvements, a temporary bridge crossing, adequate to support the increased traffic, will be installed over the creek. This improvement will likely be in the form of steel plates or a temporary bridge span placed over the existing roadway; however, the decision will be based on existing site conditions and available materials during the fieldwork. The temporary bridge will be periodically inspected during this interim cleanup action to ensure its integrity. The temporary bridge will be removed after the backfill operations are completed.

6.2.3 Stockpile and Staging Areas

Because of topography, the available working area around the Landfill is limited. Therefore, sorting, stockpiling, and profiling of the excavated landfill material prior to transportation/disposal will take place a short distance away from the Landfill. A relatively flat clearing located adjacent to Camp Bonneville cantonment area is proposed for the stockpile and lay-down area. The area is located approximately ½ to ¾ mile south of the Landfill across Lacamas Creek. A 2-acre stockpile area will be graded to drain to one end and bermed to control surface water and leachate. The

bermed stockpile area will be covered with a 20-mil or thicker liner to catch and hold any incidental water caught up in the excavated landfill material and to collect any precipitation that may come in contact with the excavated material. The liner will be protected from damage by equipment traversing it with 3 to 6 inches of compacted common fill. This material will be treated as stockpiled soil. If necessary, the stockpile itself will be covered with plastic to protect it from rain and erosion during its construction. Any surface water or leachate that may collect within the berm will be pumped off and temporarily stored in a Baker-type tank for subsequent profiling and disposal.

In addition to the stockpile area, a one-acre equipment and materials lay-down area will be cleared and graded. The lay-down area will also include an equipment decontamination pad. The decontamination pad will be lined with plastic and bermed to collect all decontamination-related liquid and solid waste. All liquid waste generated during decontamination will be pumped off and temporarily stored in a Baker tank for subsequent profiling and disposal. All solid waste will be profiled and disposed of offsite.

6.2.4 Landfill Buffer and Work Area

A buffer around the Landfill for equipment to maneuver and a small working area adjacent to the Landfill to load and maneuver trucks will be prepared. The limits of the Landfill will be mapped based on current data and the 40-foot buffer will be added to the limits. If, during the MEC/MC clearance the limits of the Landfill are adjusted, the buffer will be adjusted accordingly. Both the buffer around the Landfill and the working area adjacent to the Landfill will be cleared of vegetation, as required. The working area adjacent to the Landfill will be improved as necessary. Because of its proximity to the Landfill, this task will require inclusion of MEC/MC avoidance to protect construction workers performing intrusive tasks such as earthwork.

6.2.5 Equipment Decontamination

The trucks transporting the excavated landfill material to the stockpile area will not enter the Landfill excavation. They will stage and be loaded from a working area immediately adjacent to the Landfill excavation area. Before leaving the Landfill area, each truck will pull up to a site decontamination area where the load of excavated landfill material may be covered and all other landfill material will be mechanically removed from the exterior of the truck (e.g., tires, fenders). In addition, the road between the Landfill and the stockpile area will be routinely inspected to ensure that no landfill material has fallen off of the trucks. The same general procedures will be used before the trucks return from the stockpile area. At the close of the project, the roads will be tested randomly every 500 feet to confirm that the decontamination procedures were effective. Baseline testing will be conducted before commencing any material transporting for comparison purposes.

Should post-excavation sampling indicate that areas of the road have been contaminated due to the source removal activities, those impacted areas will be excavated and added to the Landfill stockpile for subsequent sampling and disposal. The road will then be repaired to pre-project conditions, as required.

All disposal trucks or equipment leaving the site will be decontaminated before leaving. The decontamination pad in the equipment and materials lay-down area near the stockpile area will be used. All trucks and equipment will be mechanically cleaned and inspected before being released from the Site.

6.3 CLEANUP ACTIVITIES

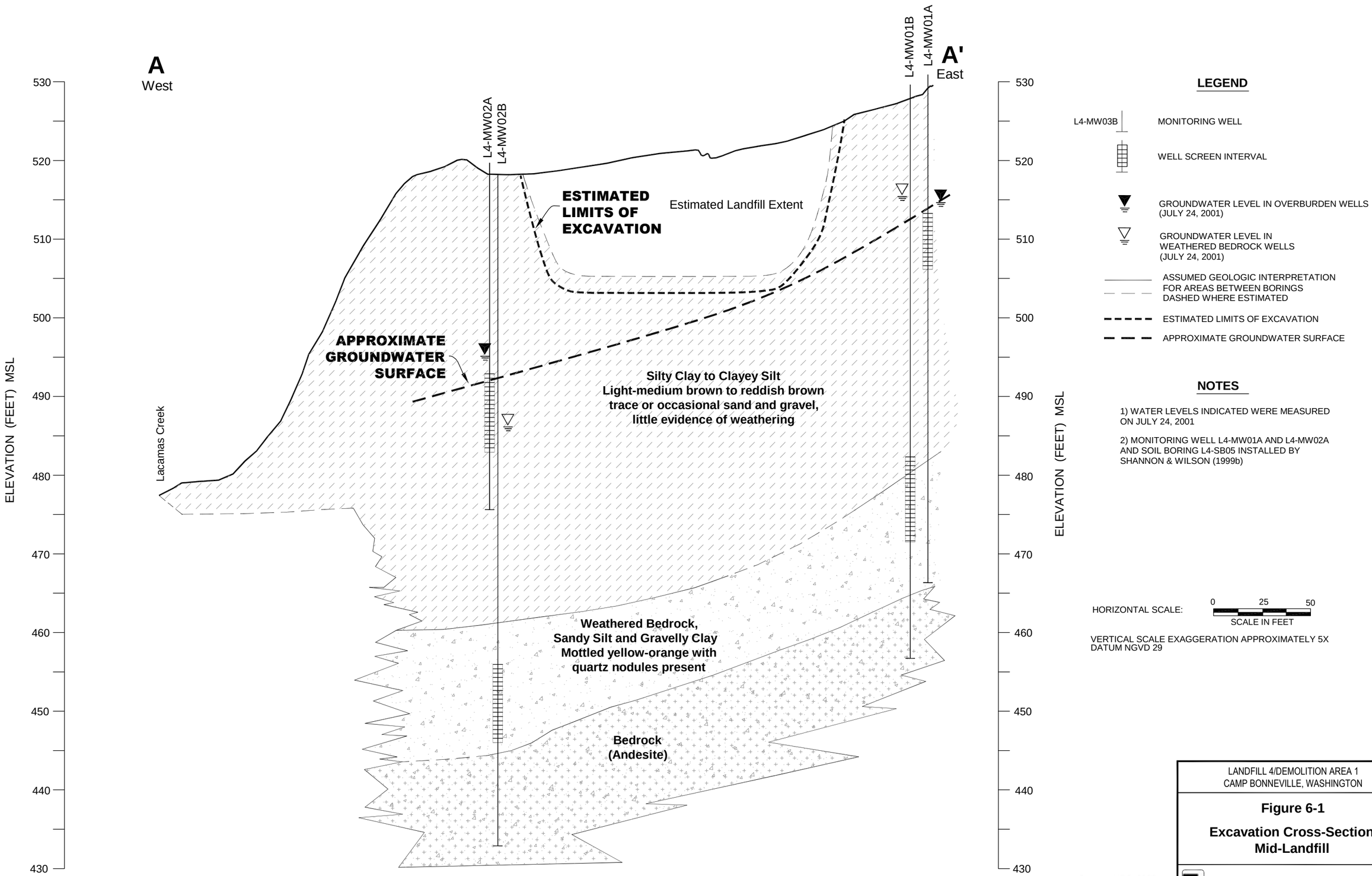
Cleanup activities will consist of excavation of the Landfill, confirmation sampling, onsite handling of the waste, waste disposal, backfilling the excavation, and site maintenance and restoration.

6.3.1 Landfill Excavation

The Landfill cannot be excavated until the Site (the limits of the Landfill, a 40 foot buffer, and the working area) has been cleared of all possible MEC/MC or related debris. Following certification of MEC/MC clearance, excavation of the Landfill will begin. All landfilled material and associated soil contaminated above established soil MTCA Method B cleanup levels are targeted for excavation and disposal. In the unlikely event that landfill debris extends into the saturated zone, it will be removed. In the unlikely event that the soil excavation extends to the water table and the results of confirmation sampling still exceed MTCA Method B cleanup levels for soil, the results of the confirmation sampling will be discussed with DOE and additional excavation or some form of treatment may be considered.

Excavation is planned to begin at the downhill side of the Landfill and progress uphill, optimizing the efficiency of the excavator while allowing the maximum space for the off-road trucks to maneuver. Sequencing the excavation in this manner will leave one end of the excavation open at all times, minimizing the potential for the accumulation of surface water in the excavation and allowing a small bulldozer and the excavator to work in tandem to excavate the Landfill. The lateral and vertical extent of the Landfill material and the impacted soil is expected to be removed before progressing upslope. The limits of the material and soil to be excavated may be determined through a combination of visual inspection and confirmation sampling. Confirmation sampling is discussed in Section 6.3.2. The walls of the excavation will be benched, as necessary, or sloped to protect against collapse. Figure 6-1 presents the general cross-section of the Landfill and estimated excavation at the mid-point of the Landfill.

The area of the Landfill is estimated to be 120 by 200 feet (24,000 ft^2) with an estimated depth in excess of 11 feet bgs. The depth to groundwater during the wet season is 15 feet bgs. The fine-



LEGEND

- L4-MW03B — MONITORING WELL
- WELL SCREEN INTERVAL
- GROUNDWATER LEVEL IN OVERBURDEN WELLS (JULY 24, 2001)
- GROUNDWATER LEVEL IN WEATHERED BEDROCK WELLS (JULY 24, 2001)
- ASSUMED GEOLOGIC INTERPRETATION FOR AREAS BETWEEN BORINGS DASHED WHERE ESTIMATED
- ESTIMATED LIMITS OF EXCAVATION
- APPROXIMATE GROUNDWATER SURFACE

NOTES

1) WATER LEVELS INDICATED WERE MEASURED ON JULY 24, 2001

2) MONITORING WELL L4-MW01A AND L4-MW02A AND SOIL BORING L4-SB05 INSTALLED BY SHANNON & WILSON (1999b)

HORIZONTAL SCALE: 0 25 50
SCALE IN FEET

VERTICAL SCALE EXAGGERATION APPROXIMATELY 5X
DATUM NGVD 29

Source: URS, 2003

LANDFILL 4/DEMOLITION AREA 1
CAMP BONNEVILLE, WASHINGTON

Figure 6-1

Excavation Cross-Section Mid-Landfill

Tetra Tech, Inc.

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grained nature of the soils at the site would make it very hard to dewater; also, it is unlikely the Site was dewatered while it was used as a landfill. Therefore, for volume estimating purposes, the maximum depth of the Landfill is presumed to be at most 15 feet bgs [13,333 in-place yd^3 at 1.6 ton/ yd^3 is 21,000 tons]. As stated earlier the vertical limits of excavation will be guided by MTCA Method B soil cleanup levels. Tetra Tech proposes to use a 40-ton excavator with a 4-yard bucket and thumb to excavate and load the Landfill material and impacted soil for transportation. The excavated material will be visually sorted into three classifications (landfill debris, obviously stained or contaminated soil, and visually uncontaminated landfill soil) before loading for transport to the stockpile area. The off-road articulated trucks (25-ton) will transport the sorted excavated material to the stockpile area for further sorting and profiling for disposal.

It is anticipated that dewatering of the Site can be avoided. Given the nature of the soils at the Site, it is not reasonable to assume that dewatering would have been part of the operation of the Landfill and, therefore, it is not presumed to be part of the excavation of the Landfill or the impacted soils, although the vertical limits of excavation will be guided by the MTCA Method B soil cleanup levels. Water that has infiltrated into the Landfill and accumulated in the bottom may be pumped out with a suction trash pump and stored in a Baker tank for later profiling and disposal.

A UXO Safety Officer will remain onsite during all excavation and sorting activities following the UXO removal phase. All construction equipment brought onsite will be decontaminated before being removed from Camp Bonneville.

6.3.2 Confirmation Sampling

Tetra Tech proposes not to perform a separate boundary investigation prior to landfill excavation. The boundary borings that have been drilled onsite are sufficient to define the general boundaries of the Landfill, and additional borings would not add significant value. The visual inspection and the confirmation soil samples collected during the excavation of the Landfill will be used to define the Landfill boundaries. During the excavation of the Landfill, visual inspection will be used to ensure that all of the suspected landfill material and associated debris has been removed. Confirmation soil samples of the walls and the floor of the excavation will be collected to ensure that the soil contaminated above MTCA Method B cleanup levels has been excavated and removed. The inspection and the confirmation samples will be used to define the boundary of the materials required to be removed and provide the supporting analytical data. Tetra Tech will inspect the entire excavation and proposes to collect confirmation soil samples from the bottom of the excavation on minimum 25-foot grid spacing. In addition, up to 12 biased samples may be collected, depending upon site-specific conditions and in consultation with DOE. The site conceptual model that provided the rationale for the grid size is discussed in the SAP. We anticipate collecting soil confirmation samples every 40 feet along the walls of the excavation, at the midpoint

on the wall and 1 foot bgs. The samples will be analyzed for the COPCs presented in the SAP. It is anticipated that at some point in the excavation of the Landfill that removal activities will cease until analytical results are received and the results can be discussed with the DOE. If any of the confirmation samples from soils located above the saturated zone produces results above the cleanup criteria, additional excavation will be performed and additional confirmation sampling will be conducted, as required. The additional confirmation samples will be analyzed for only those analytes that exceeded the cleanup criteria in the original testing. In the unlikely event that soil excavation extends to the water table and the results of confirmation sampling still exceed MTCA Method B cleanup levels for soil the results of the confirmation sampling will be discussed with DOE and additional excavation or some form of treatment may be considered.

6.3.3 Onsite Loading, Transportation, Sorting, and Stockpiling of Excavated Material

The trucks transporting the excavated landfill material to the stockpile area will not enter the Landfill excavation. They will stage and be loaded from a working area immediately adjacent to the Landfill excavation area. All material removed from the Landfill will be separated by material type (debris, visually uncontaminated soil, and visually contaminated soil) and staged for transport. The staged material will be loaded into the off-road trucks with a front end loader. The trucks will then be mechanically decontaminated and may be covered before transport to the designated stockpile area. The debris may include broken concrete, rocks, steel (non-UXO), wood, and other nonsoil materials. This debris may be further processed and sent to a recycling facility if uncontaminated and viable. If the debris is contaminated, it would go to the appropriate offsite disposal facility.

6.3.4 Offsite Disposal

The excavated material from the Landfill will be visually sorted into three classifications (landfill debris, obviously stained or contaminated soil, and visually uncontaminated landfill soil) for profiling before disposal. The total volume of material to be disposed of is estimated to be 13,333 in place yd^3. It is estimated this will produce 16,667 loose yd^3 of waste. In discussions with the disposal facilities, it was determined that waste characterization will require a sample every 200 yd^3 for the first 2,000 yd^3 and a sample every 500 yd^3 subsequently. The samples will be analyzed for all those chemicals required to be tested for by the disposal facility. Hazardous waste will be disposed by the ton at Waste Management Facility, Arlington, Oregon. Non-hazardous/debris waste could be disposed of by the ton at Hillsboro, Oregon. Other disposal facilities in the area may be used for disposal of the non-hazardous waste as well. The waste will be transported by highway trucks. The trucks will be lined with plastic before being filled with hazardous waste and will be decontaminated before leaving the Site. Any waste suitable for recycling, such as concrete, steel/metals, and wood will be characterized and recycled accordingly, as appropriate and feasible. All hazardous waste will be manifested and the disposal documented.

6.3.5 Backfill and Compaction of the Excavated Landfill

The trucks transporting the hazardous waste offsite for disposal will be lined with plastic before being filled with waste and will be decontaminated before leaving the site. If necessary, the trucks will also be decontaminated when they leave the disposal facility. This will allow for the same trucks that transport the waste for disposal to backhaul suitable fill for the backfill of the Landfill excavation, if feasible.

It is estimated that approximately 18,000 tons of material will be required to backfill the Landfill excavation. Suitable fill from offsite will be backhauled to the site. The material will be stockpiled at the lay-down yard and transported to the excavation with off-road trucks. The fill will be placed in the excavation in lifts and will be compacted to 85% of maximum dry density in accordance with American Society for Testing and Materials (ASTM) D1557.

6.3.6 Site Maintenance and Restoration

Surface water at the Site will be controlled with upstream trenches and sand bags around the perimeter. The creek will be protected from siltation from the excavation with a combination of silt fences and catch basins.

Haul roads on the Site will be patrolled routinely to ensure that waste has not inadvertently fallen off any trucks. In addition the roads will be routinely graded to maintain a safe operating surface.

The Landfill will be backfilled and graded to blend into the surrounding topography. After backfill has been completed, the Site will be stabilized with erosion mats, if necessary, and will be revegetated with native or grass-type species.

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7. DOCUMENTATION

This section specifies the documentation to be kept by both the on-site UXO and construction personnel. Both the Senior UXO and the construction staff will be required to collect and maintain similar records. There should not be any duplication of effort, since the two activities do not run in parallel. MEC/MC and construction activities will be documented using a variety of reports and forms including the following:

- Field logbooks;
- Daily activity reports;
- Daily health and safety briefing sign-in sheets;
- Surface clearance report forms;
- Intrusive investigation data/MEC accountability forms;
- QC inspection reports (see Section 5.3); and
- Health and safety reporting forms (see the site-specific HASP for MEC activities).

QC reporting is discussed in detail in Section 5.3 of this CAWP and in the Quality Assurance Project Plan (QAPP). Health and safety reporting requirements are covered in detail in the site-specific HASP for MEC Support Activities. The other types of documentation for MEC activities are discussed in the following paragraphs.

7.1.1 Field Logbooks

Field logbooks will be used routinely to record daily activities and unusual events for this project. Each UXO team leader and the construction foreman will keep a logbook containing a record of all daily activities performed by the team or each crew. Data recorded in the logbook will include the following:

- Date;
- Start time for field activities;
- Documentation of the daily tailgate safety briefing;
- Documentation of equipment checks/calibration;
- Documentation of vehicle inspections;
- The names of all personnel working on the Site that day;
- A list of equipment used by the team;

- A chronological list of activities performed by the team;
- Any unusual events occurring at the work site;
- Any injuries or health and safety concerns; and
- The stop time for field activities.

The information contained in the logbook will be the basis for preparation of the daily activity report. Therefore, this information should be as complete and concise as possible.

The SUXOS and Site Superintendent will also maintain a logbook in which to record daily activities and any other pertinent information. Data recorded in the logbook will include the following:

- Date;
- Start time for meetings, briefings, and other activities;
- Documentation of the daily operations briefing (concurrent with the health and safety briefing);
- Documentation of heavy equipment inspections;
- The names of personnel working onsite that day;
- A list of equipment used (or present) onsite;
- Any unusual events occurring at the work site;
- Any injuries or health and safety concerns;
- Equipment failure and other problems occurring;
- Hours worked by subcontract employees onsite; and
- The stop time for field activities.

The information contained in the logbook will be the basis for preparation of the daily operations report. Therefore, this information should be as complete and concise as possible.

The UXOSO/UXOQC and the Site Health and Safety Officer will also maintain a logbook in which to record health and safety and QC data. The information in this logbook will be instrumental in ensuring and documenting compliance with all health and safety provisions and QC requirements. The information recorded in the logbook will include the following:

- Documentation of the daily health and safety briefing;
- A record of any injuries or illnesses occurring;
- A record of all health and safety inspections and audits held onsite;

- The results of each inspection or a reference to the report number documenting the health and safety inspection/audit;
- A record of all QC inspections and audits held onsite; and
- The results of each inspection or a reference to the report number documenting the QC inspection/audit.

The information contained in the logbook will be the basis for preparation of numerous health and safety and QC reports. Therefore, this information should be as complete and concise as possible.

7.1.2 Daily Activity Reports

The UXO Team Leader and the Construction Foreman will be responsible for preparation of a daily activity report. This report will be submitted to the SUXOS or the Site Superintendent at the end of each working day and will summarize all work completed each day. Information contained in the report will include:

- Date;
- Start time for field activities;
- Documentation of the daily tailgate safety briefing;
- The names of personnel working that day;
- A list of equipment used by the team;
- A chronological list of activities performed by the team;
- Any unusual events occurring at the work site;
- Any injuries or health and safety concerns; and
- The stop time for field activities.

A blank Daily Activity Report form is included in Appendix A, SOP 1.

7.1.3 Daily Operations Report

The SUXOS and the Site Superintendent will be responsible for preparation of daily operations reports. These reports summarize the work performed onsite on any particular day and specify the equipment and personnel used to accomplish the work. In the report, they will note any QC or health and safety issues that arise and will document any site inspections/audits performed. At a minimum, these reports will include the following:

- The date and time operations began;
- The date and time operations were completed;
- The number of hours expended in performing operations;
- Equipment used by the personnel and subcontractors each day;
- Verification of equipment/instrument calibration or testing;
- Verification of the daily tailgate health and safety briefing; and
- Any unusual or unique events affecting the daily operations or team personnel (injuries, accidents, sightings of threatened or endangered animals, etc.).

Completed inspection/audit reports will be attached to the daily report. The daily reports will be submitted to their respective Project Manager and copied to the Program Manager. A copy of the reports will also be kept in the project files onsite. A blank Daily Operations Report form is included in Appendix B.

7.1.4 Daily Health and Safety Briefing Sign-in Sheets

The daily health and safety briefing sign-in sheet will be used to ensure that all personnel onsite are attending the daily briefing and are receiving continuing training with respect to site-specific health and safety issues. In addition to a space for the names of attendees, the sheet also has designated areas for recording the content on the daily briefing and any concerns raised by site personnel. The briefing is an essential tool in the implementation and management of the site HASP, as well as an integral part of the corporation's Zero Incident Program.

At the end of each daily briefing, the SUXOS and the Site Superintendent will review the sign-in sheet to ensure that all attendees are listed and will submit the sheet to the UXOSO and the Site Health and Safety Officer for inclusion in the project health and safety files. A blank copy of the daily briefing sign-in sheet is included in the ordnance operations HASP for the project.

7.2 UXO SPECIFIC DOCUMENTATION

7.2.1 Surface Clearance Data Forms

UXO Team Leaders will be responsible for completing the surface clearance data forms. These forms will be used to record pertinent clearance data for the project including the following:

- The number and type of MEC items found in each search area (lane or grid);
- The number of MC found in each area; and
- The number of subsurface contacts noted in each lane or grid.

For this particular project, the exact location (coordinates) of MC will not be recorded. The location coordinates for any MEC found will be recorded in the Team Leader's field logbook and on the MEC Investigation Data Form (see Section 7.2.2). A blank copy of the Surface Clearance Data Form is included in Appendix A, SOP 1.

Completed surface clearance data forms will be submitted to the SUXOS at the end of each field day. The SUXOS will review the data forms, note and correct any errors, and place them in the project file.

7.2.2 MEC Investigation Data Sheet/MEC Accountability Form

The upper portion of the MEC Investigation Data /MEC Accountability Form will be used to record pertinent data for any MEC found onsite including the following:

- Project name;
- Date;
- Location (coordinates and depth) of all MEC items encountered;
- A physical description of the items (width, length, diameter, general shape, color);
- Identification of the ordnance (type, fuzing, filler);
- Status and condition of the ordnance (used vs. unused; fired vs. unfired); and
- Photograph log ID number.

The UXO Team Leader will enter the appropriate data on the upper portion of the form (field data) and will submit the forms to the SUXOS at the end of each work day. The SUXOS will review the data forms, note and correct any errors, then use the lower portion of the form to track any transport or storage of MEC items and their ultimate disposal. Once the disposal is complete, the SUXOS will place the completed forms in the project file.

Pertinent data from the MEC Accountability section of the form will be entered into the MEC accountability log, which is an electronic summary log for all MEC items found. This log will be maintained by the SUXOS on a computer in the project office at Camp Bonneville. A blank copy of the MEC Investigation Data /MEC Accountability Form is included in Appendix A, SOP 4.

7.2.3 MEC Accountability Log

The SUXOS will use the MEC Accountability Log to summarize tracking data for all MEC items found at the Landfill. Selected data from the MEC Accountability Form will be entered into the electronic accountability log on a daily basis so that the PM and the Client may be kept informed of the results of the MEC/MC avoidance activities.

7.2.4 QC Reports and Forms

Several QC reports will be generated for this project including:

- Preparatory Inspection Reports;
- Initial Inspection Reports;
- Final Inspection Reports;
- Deficiency Notices; and
- Non-conformance Notices.

The QC reporting requirements are presented in detail in Section 5.3.

7.2.5 Range Residue Certificate for MC

A range residue certification form will be completed for each container of material proposed for transfer to a local recycler or demilitarization facility. The form will be completed as a container is filled and as items are individually inspected to ensure that no danger of detonation or explosion remains. Copies of the form will be attached to the container and provided with the bill of lading for shipment. A second copy of the form will be placed in the project files. The forms will be used as the principal tool for maintaining accountability for materials and inspection to confirm that the items are safe for unlimited release to the public. This form will also be completed for any MC that is left onsite at the direction of the Army (i.e., buried at a specified location onsite).

7.3 CLOSURE REPORT

Tetra Tech will document the completion of the CAWP with a closure report. The closure report will reference the appropriate planning documents and document the UXO clearance, UXO disposal, landfill excavation (waste and impacted soil), disposal of all excavated material, results of all confirmation sampling, and any deviations from the plan. The closure report will include an Operation and Maintenance Plan for the site and a Groundwater Monitoring Plan, if required.

The goal of the action is that any residual contamination must be protective of groundwater. If the nature and extent of the soil contamination is more than anticipated, such that it is technically impracticable to remove all contaminated soil, implementation of other closure measures that satisfy the criterion may be considered and will be documented in the closure report.

8. COMPLIANCE MONITORING

The goal of this phase of the interim cleanup is to remove all sources of groundwater contamination at the Site. Therefore, it is not anticipated that this phase of the closure of the Landfill will require any compliance monitoring.

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9. PUBLIC PARTICIPATION

Both DOE's MTCA and CERCLA require public involvement on an interim action.

CERCLA requires that the Engineering Evaluation/Cost Analysis (EE/CA) be made available for review and that the public be notified of the Interim Action. A summary of the EE/CA and the public's comments are then addressed in an Action Memorandum. Tetra Tech was not tasked to prepare an EE/CA. It is assumed that the activities performed to date and the associated documentation will serve as the EE/CA and that only the Action Memorandum will have to be prepared. An Action Memorandum is prepared for all removal actions performed under CERCLA after the EE/CA has been made available for public review and comment. The Action Memorandum is based on information contained in the EE/CA Report and consideration of public comments and community concerns.

Tetra Tech will prepare a concise Action Memorandum that identifies the response action chosen for implementation at the Site. As the primary decision document for the response action, the Action Memorandum will serve the following functions: (1) substantiate the need for the response action, (2) identify the proposed action, (3) explain the rationale for the response action selection, and (4) document that the appropriate process was followed in the selection of the response action.

MTCA requires that routine cleanup and interim actions include the following public involvement. Public notice shall be provided for any proposed routine cleanup or interim action. This public notice shall be combined with public notice of an order or settlement whenever practicable. At a minimum, the public notice shall briefly discuss the following:

- Describe the site;
- Identify the proposed action, including institutional controls and the permit exemptions authorized under RCW 70.105D.090;
- Identify the likely or planned schedule for the action;
- Reference any planning documents prepared for the action;
- Identify department staff who may be contacted for further information; and
- Invite public comment on the routine cleanup or interim action. The public comment period shall extend for at least 30 days from the date of the mailing of notice.

Tetra Tech will work with the Army and DOE to meet all public participation requirements including participation in the Restoration Advisory Board (RAB) as needed.

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10. STATE ENVIRONMENTAL POLICY ACT

The State Environmental Policy Act (SEPA) is intended to provide information to agencies, applicants, and the public to encourage the development of environmentally sound proposals. The environmental review process involves the identification and evaluation of probable environmental impacts, and the development of mitigation measures that will reduce adverse environmental impacts. This environmental information, along with other considerations, is used by agency decision-makers to decide whether to approve a proposal, approve it with conditions, or deny the proposal. SEPA applies to actions made at all levels of government within Washington State. The environmental review process involves a number of steps that are briefly described below.

Although not included in the SEPA Rules, it is recommended that agencies offer a process for the applicant to discuss a proposal with staff prior to submitting a permit application or environmental checklist. The applicant and agency can discuss existing regulations that would affect the proposal, the steps and possible timeline for project review, and other information that may help the applicant submit a complete application; and determine whether environmental review is required for the proposal by (1) defining the entire proposal, (2) identifying any agency actions (licenses, permits, etc.), and (3) deciding if the proposal fits one of the categorical exemptions. If the project does not involve an agency action, or there is an action but the project is exempt, environmental review is not required. Agency decisions are the hub of SEPA; if there is no agency action, SEPA is not required.

If environmental review is required, the "lead agency" is identified. This is the agency responsible for the environmental analysis and procedural steps under SEPA. The lead agency must review the environmental checklist and other information available on the proposal and evaluate the proposal's likely environmental impacts. The lead agency and applicant may work together to reduce the probable impacts by either revising the proposal or identifying mitigation measures that will be included as permit conditions.

After evaluating the proposal and identifying mitigation measures, the lead agency must determine whether a proposal would still have any likely significant adverse environmental impacts. The lead agency issues either a determination of nonsignificance (DNS), which may include mitigation conditions, or if the proposal is determined to have a likely significant impact, a determination of significance/scoping notice (DS/Scoping) is issued and the environmental impact statement (EIS) process is begun. The EIS will analyze alternatives and possible mitigation measures to reduce the environmental impacts of the proposal.

The agency decision-maker must consider the environmental information, along with technical and economic information, when deciding whether to approve a proposal. Decision-makers may use SEPA substantive authority to condition or deny a proposal based on information in the SEPA

document and the agency's adopted SEPA policies. Categorical exemptions are types of projects or actions that are not subject to SEPA review. Proposals are categorically exempt because the size or type of the activity is unlikely to cause a significant adverse impact.

An emergency exemption can be granted by the lead agency when an action is needed to avoid an imminent threat to public health or safety, public or private property, or to prevent serious environmental degradation.

For this project it is very likely that DOE will be the lead agency. If the project is not given an emergency exemption, then at a minimum the environmental checklist will have to be prepared and submitted to the lead agency for review, and the agency will have to determine if further environmental assessment will be required.

11. SCHEDULE

The major milestones and their respective delivery dates are summarized below.

Task	Delivery Date
CAWP Draft Final	January 2004
CAWP Final	March 2004
Mobilization	May 2004
Site Improvements	June 2004
UXO Clearance	July 2004
Begin Excavation	August 2004
Confirmation Sampling	August 2004
Backfill Excavation	September 2004
Site Restoration and Demobilization	October 2004
Closure Report	November 2004

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12. REFERENCES

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